



TORONTECH



FIRE RETARDANT COATING TEST FURNACE

Fire Retardant Coating Test Furnace — ToronFT™ FR-SS

ToronFT™ FR-SS **Fire Retardant Coating Test Furnace** is a precision laboratory-scale fire resistance test furnace specifically designed for the thermal insulation efficiency deviation and thermal insulation efficiency attenuation testing of steel structure fire retardant coatings.

Fully compliant with ISO 834-1 standard requirements, the ToronFT™ FR-SS provides the controlled, high-temperature fire exposure environment required to characterize the fire protection performance of intumescent and cementitious fire retardant coatings on small steel specimens — enabling manufacturers and laboratories to perform standard-compliant coating qualification testing without the cost and space requirements of full-scale structural fire resistance furnaces.

The small sample fire resistance test furnace accommodates three specimens simultaneously, with a horizontal test furnace volume of 1200 mm (L) × 1050 mm (W) × 450 mm (D) and a five-layer furnace wall capable of sustaining fire resistance temperatures up to 1600°C.

APPLICATIONS

Fire Retardant Coating Test Furnace — ToronFT™ FR-SS Applications

- Fire retardant coating manufacturers: thermal insulation efficiency deviation and attenuation testing for steel structure coating product qualification
- Third-party certification and testing laboratories: small-sample fire resistance coating performance testing per ISO 834-1
- Steel structure fabricators and specifiers: evaluation of fire retardant coating performance for structural steel protection applications

- R&D departments: evaluation of new intumescent and cementitious fire retardant coating formulations and application thicknesses
- Quality assurance programs: batch sampling and consistency verification of fire retardant coating thermal protection performance



Standards

The ToronFT™ FR-SS supports fire retardant coating fire resistance testing in compliance with internationally recognized fire protection and structural fire testing standards, including:

- ISO 834-1: Fire resistance tests — Elements of building construction — General requirements

FEATURES

Fire Retardant Coating Test Furnace — ToronFT™ FR-SS Key Features

- Designed specifically for thermal insulation efficiency deviation and attenuation testing of steel structure fire retardant coatings
- Horizontal test furnace internal dimensions: 1200 mm (L) × 1050 mm (W) × 450 mm (D) — compact laboratory-scale footprint
- Three specimens tested simultaneously — efficient qualification throughput for R&D and production quality assurance
- Five-layer furnace wall construction (outside to inside): steel structure frame, red brick periphery, fire-resistant high-temperature asbestos, refractory brick, mullite fire-resistant high-temperature cotton — rated to 1600°C fire resistance temperature
- Furnace body outer surface temperature: does not exceed 45°C — safe for operator access during testing
- Integrated instrument composition: vertical fire test furnace, combustion control, fuel supply, pressure release and measurement, flue gas emission system, computer control system, furnace temperature data acquisition system, test component temperature acquisition system, and special test software
- Computer-controlled test execution with real-time temperature monitoring and automated data acquisition
- Compliant with ISO 834-1 — internationally recognized fire resistance test standard

THEORY & METHOD

Theory and Method

Thermal insulation efficiency testing evaluates the ability of a fire retardant coating to limit the rate of temperature rise in the protected steel substrate when exposed to the standard fire curve. Three coated steel specimens are placed in the horizontal test furnace and exposed to the ISO 834 time-temperature curve. The temperature at the steel substrate surface (below the coating) is measured continuously throughout the exposure period using the test component temperature acquisition system, while the furnace chamber temperature is tracked by the furnace temperature data acquisition system. Thermal insulation efficiency deviation measures the variation between the actual measured substrate temperature and the target temperature profile, quantifying how consistently the coating maintains its fire protection performance.

Thermal insulation efficiency attenuation measures the degradation of coating performance over extended fire exposure — characterizing the coating's behavior as the intumescent char forms, expands, and eventually begins to degrade. The computer control system manages the entire test sequence, including furnace temperature control, burner modulation, flue gas emission system operation, and real-time data acquisition and analysis.

TECHNICAL SPECIFICATIONS

Fire Retardant Coating Test Furnace — ToronFT™ FR-SS Technical Specifications

Parameter	Specification
Model	ToronFT™ FR-SS
Test Application	Thermal insulation efficiency deviation and attenuation of steel structure fire retardant coatings

Parameter	Specification
Furnace Orientation	Horizontal
Test Furnace Internal Dimensions (L×W×D)	1200 mm × 1050 mm × 450 mm
Number of Simultaneous Specimens	3
Furnace Wall Construction (5 layers)	Steel frame / Red brick / Fire-resistant asbestos / Refractory brick / Mullite high-temperature cotton
Maximum Fire Resistance Temperature	1600°C
Furnace Body Outer Surface Temperature	≤ 45°C
Standard Compliance	ISO 834-1
Instrument Composition	Furnace, combustion control, fuel, pressure release/measurement, flue gas, computer control, temp acquisition (furnace + specimen), test software



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